Distracted Driving Trends

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Overview

- What is Distracted Driving?
- What does the research say?
- Technology solutions
- Remaining challenges

Distracted Driving = f(Inattentive Driving)

What is Inattentive Driving?

- **Insufficient or no attention given to activities critical to safe driving** (Regan et al, 2011)
- Different components – not all inattentive driving is distracted driving

What is Distracted Driving?

1. **Driver Restricted Attention (DRA):** Brought about by something that **physically prevents the driver from detecting and therefore attending to information** critical for safe driving.

What is Distracted Driving? (cont'd)

2. **Driver Misprioritized Attention (DMPA):** Brought about by the driver **focusing attention on one aspect of driving to the exclusion of another**, which is more critical for safe driving.

What is Distracted Driving? (cont'd)

3. **Driver Neglected Attention (DNA):** Brought about by the **driver neglecting to attend to** activities critical to safe driving.

What is Distracted Driving? (cont'd)

4. **Driver Cursory Attention (DCA):** Brought about by the driver **giving cursory or hurried attention** to activities critical for safe driving.

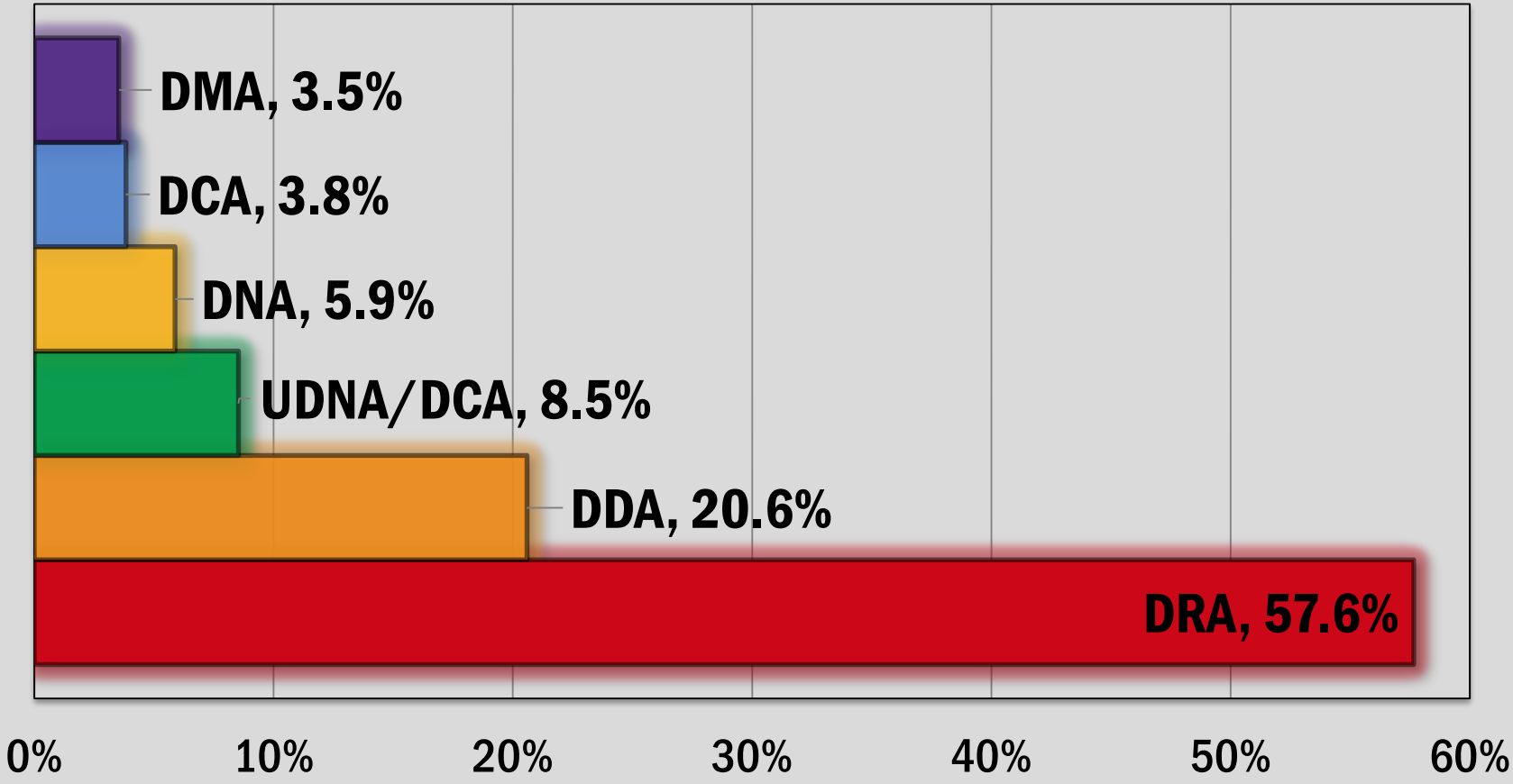
What is Distracted Driving? (cont'd)

5. **Driver Diverted Attention (DDA):** Brought about by the **diversion of attention toward a competing activity**. DDA is more commonly presented as **distracted driving**, and may be composed of two sub-categories:

What is Distracted Driving? (cont'd)

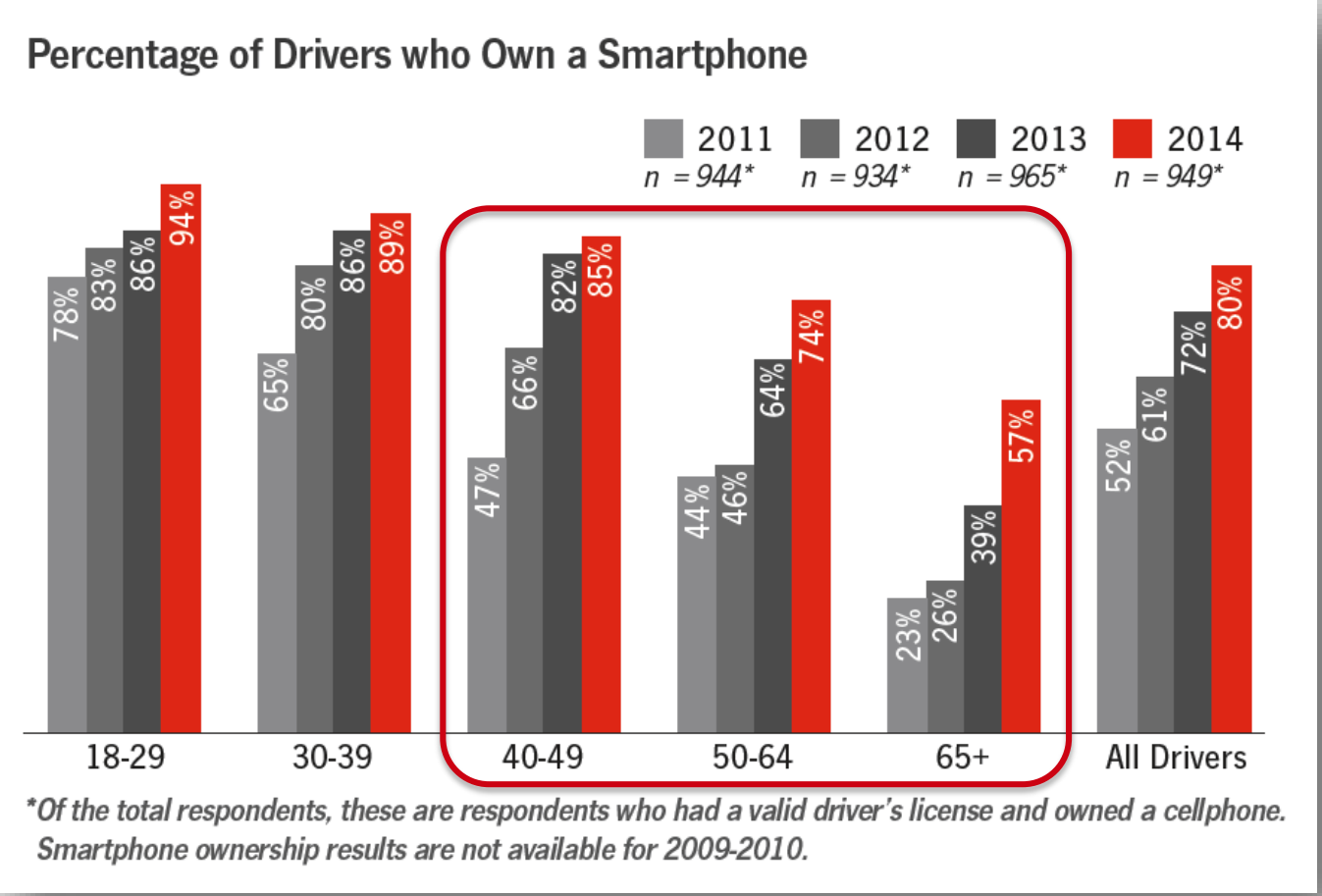
- **DDA, non-driving-related (DDA-NDR):** Driver diverts attention away from activities critical for safe-driving toward a non-driving-related competing activity.
- **DDA, driving-related (DDA-DR):** Driver diverts attention away from activities critical for safe-driving toward a driving-related competing activity

Distracted Driving



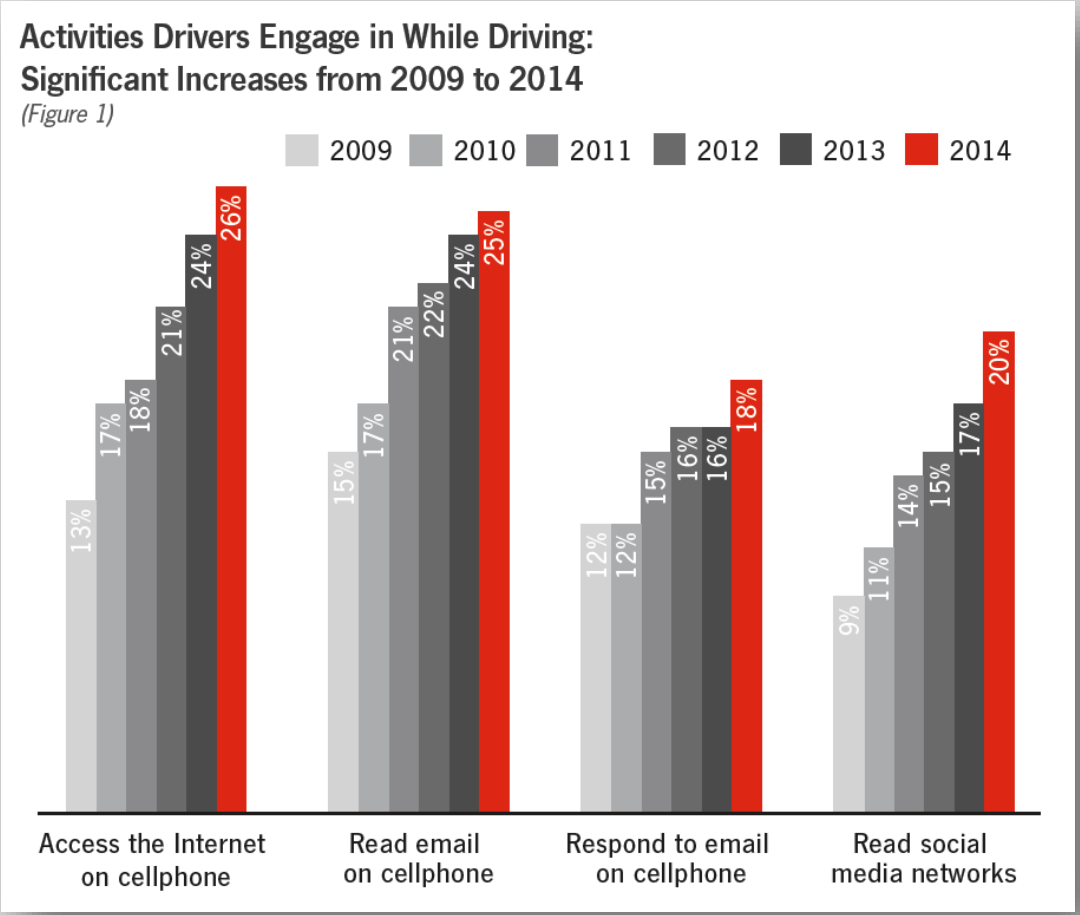
Source: Beanland et al, 2013

Distracted Driving Trends

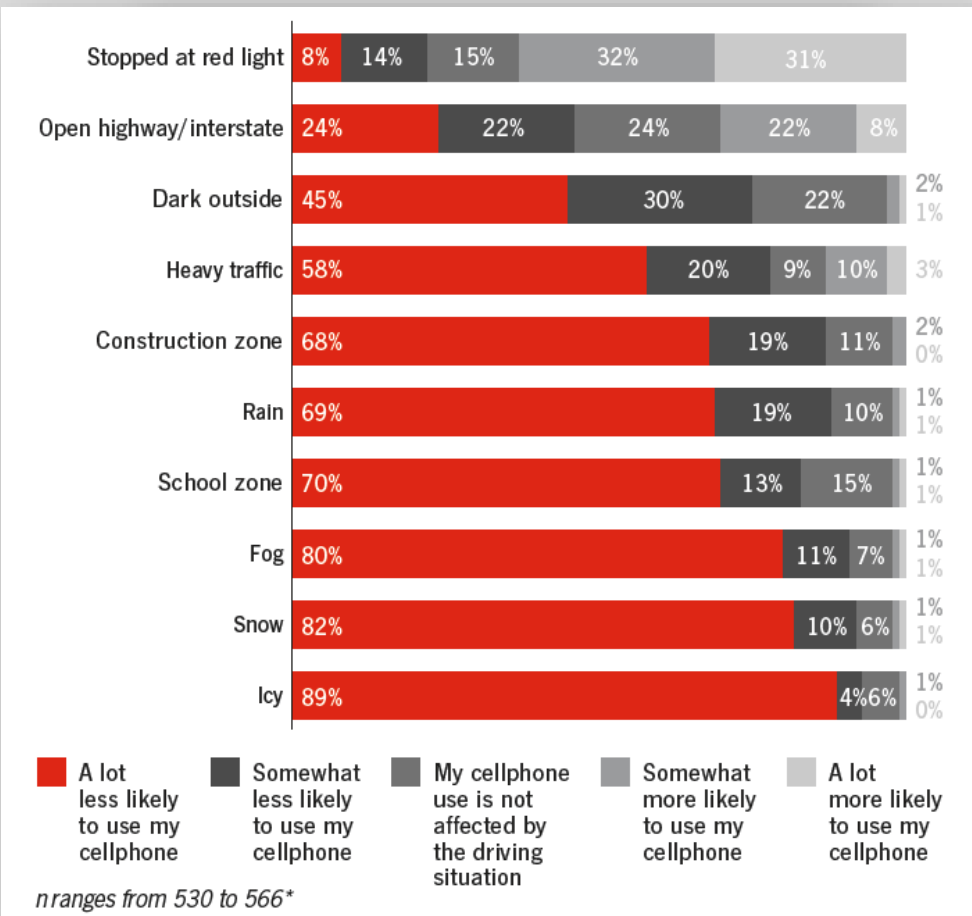


Source: State Farm (2014), Distracted Driving

Distracted Driving Trends (cont'd)



Distracted Driving Trends (cont'd)



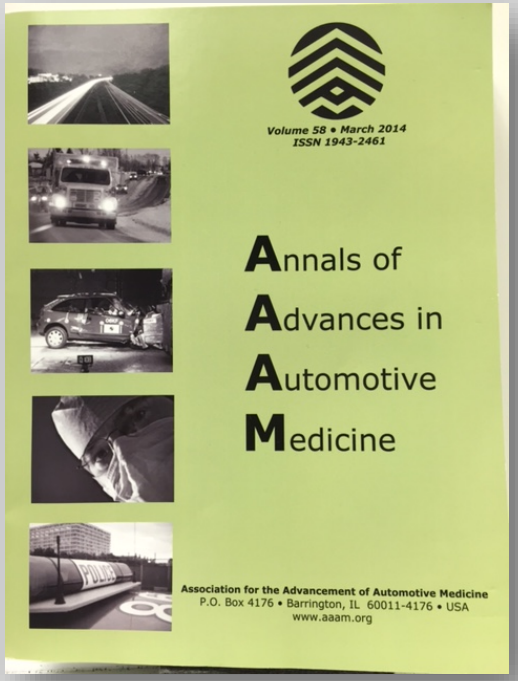
Naturalistic Driving Research, Dingus et al

Secondary tasks	100-Car Study, 2002		2013 Cell Phone Study		NTDS		CVO	
	n=109	13 months	n=204	3 months	n=42	18 months	n=103	4 months
	Frequency	Odds Ratio	Frequency	Odds Ratio	Frequency	Odds Ratio	Frequency	Odds Ratio
Cell-phone use:								
Call-related visual-manual	-	-	6.96%	**3.34***	-	-	-	-
Text-related visual-manual	-	-	4.90%	**2.12***	-	-	-	-
Hand-held text / Internet	-	-	0.89%	1.73	1.52%	**3.87***	0.19%	**23.24***
Hand-held dial	0.51%	**2.79***	-	-	0.54%	**8.32***	1.18%	**5.93***
Reaching for a phone	0.08%	1.38	1.42%	**3.65***	0.48%	**7.05***	0.10%	**6.72***
Talking / Listening hand-held	2.56%	1.29	2.25%	0.84	0.39%	0.61	5.19%	1.04
Talking / Listening hands-free portable	-	-	0.67%	1.19	-	-	4.99%	**0.44***
Talking / Listening hands-free integrated	-	-	1.01%	0.61	-	-	-	-
Vehicle Instrumentation:								
Vehicle Operations	0.65%	0.55			1.78%	2.60	4.20%	1.25
Dispatch Device (CV)	-	-			-	-	1.14%	**9.99***
Internal Distractions:								
Reading (map)	-	-			-	-	0.46%	**7.02***
Reading (other)	0.01%	**3.38***			0.02%	-	1.06%	**3.97***
Writing	0.01%	-			0.02%	-	0.21%	**8.98***
Reaching for an object	0.71%	1.38			1.95%	**8.00***	6.49%	**3.09***
Interacting with passenger	1.16%	**0.50***			3.40%	1.40	1.39%	**0.35***
External Distractions:								
Looking at roadside object	0.38%	**3.70***			12.28%	**3.90***	26.22%	**0.54***
Personal Habits:								
Eating	0.51%	1.57			1.11%	**2.99***	3.75%	1.01
Drinking	0.16%	1.03			0.24%	1.36	1.52%	0.97
Grooming	0.57%	0.70			0.50%	1.25	0.12%	**4.48***
Applying make-up	0.14%	**3.13***			0.06%	-	-	-
Smoking / Tobacco use	0.18%	-			0.06%	-	6.48%	0.81

* Statistically significant at $p<0.05$.

Key Takeaways from Distracted Driving Research

- **Eyes-off-the-forward roadway** (EOFR) seems to be the critical factor in distractions that contribute to unsafe driving
- Naturalistic driving research indicates that the **prevalence is low**
- **Novice drivers are especially vulnerable** due to inexperience and immaturity



How can we mitigate these risks?

- Better education and training
  - Hazard detection, RAPT3 (Fisher et al)
  - Road Aware® (available at teendriving.statefarm.com)
- Technology
  - Self-driving cars – hype vs. reality
  - How soon?
  - Transportation and mobility innovations

Self Driving Cars

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Self-driving cars can be fooled by fake signals

by Jon Fingas | @jonfingas | September 5th 2015 At 4:29pm

You'd think that self-driving cars would be most vulnerable to remote hacks, but the bigg

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MUST READ: Catch up on all the news from Apple's event in one place

A new age of transportation is upon us and it's self-driving

@jonturi | August 15th 2015 At 11:00am

We're on the cusp of change: Self-driving cars have begun to hit the streets with the goal of making transportation safer. The dream of a self-driving-car future, it would seem, is becoming a reality and it's

Volvo's Drive Me Project

THE VERGE

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Volvo will run a public test of self-driving cars with 100 real people in 2017

By Chris Ziegler on February 23, 2015 01:55 pm Email @zpower

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Volvo announced late last week that it'll be testing its autonomous driving system, Drive Me, out in the wild with real drivers when it hits the road in 2017. The test will take place in and around Volvo's hometown of Gothenburg, Sweden.

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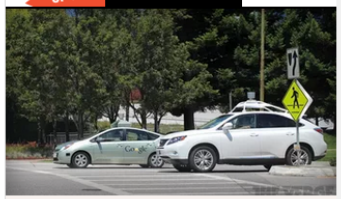


55 UPDATES TO
Self-driving cars: Google and others map the road to automated vehicles

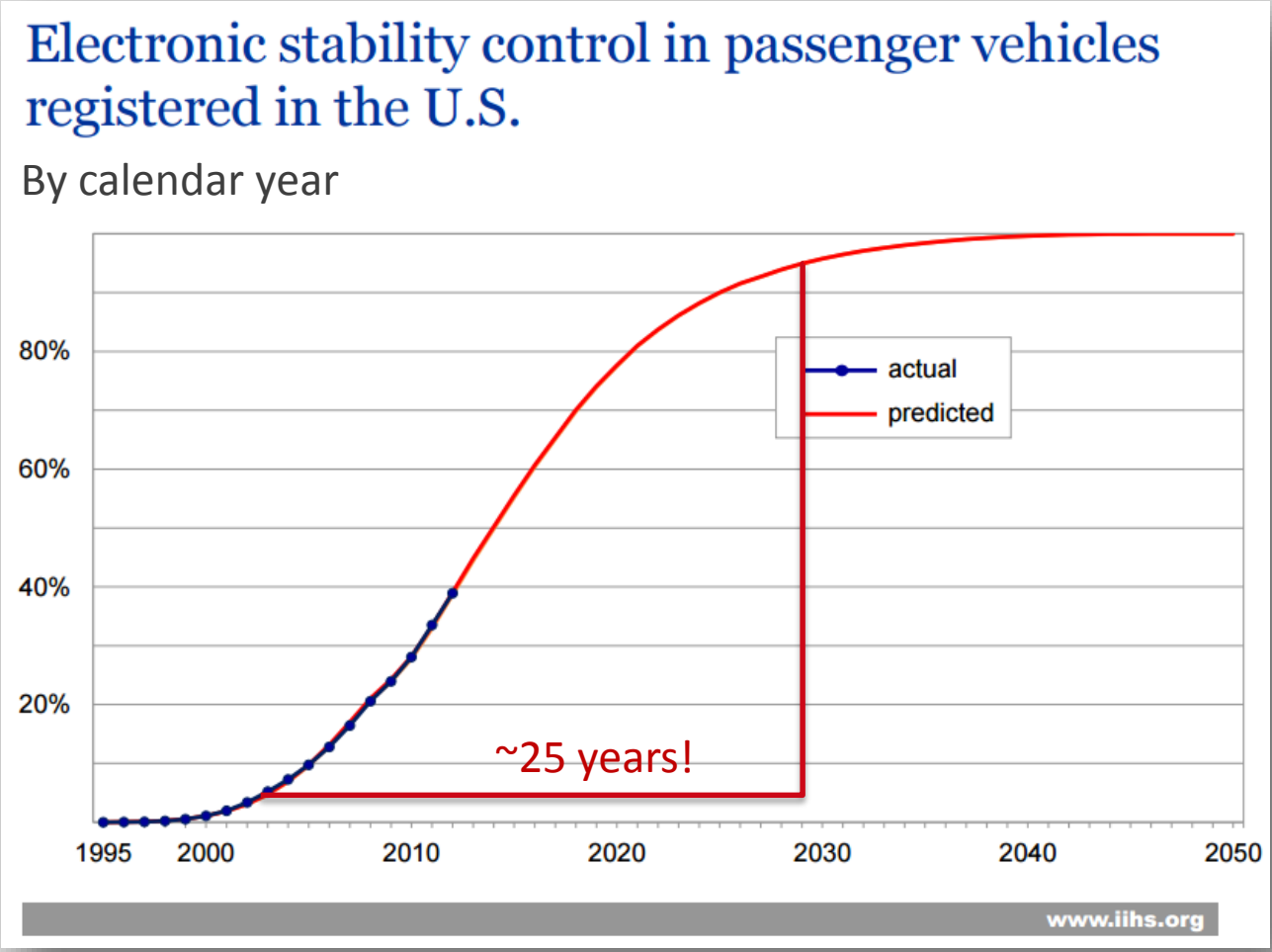
MAY 15 Google's self-driving car is hitting public roads this summer

MAR 17 Elon Musk: cars you can drive will eventually be outlawed

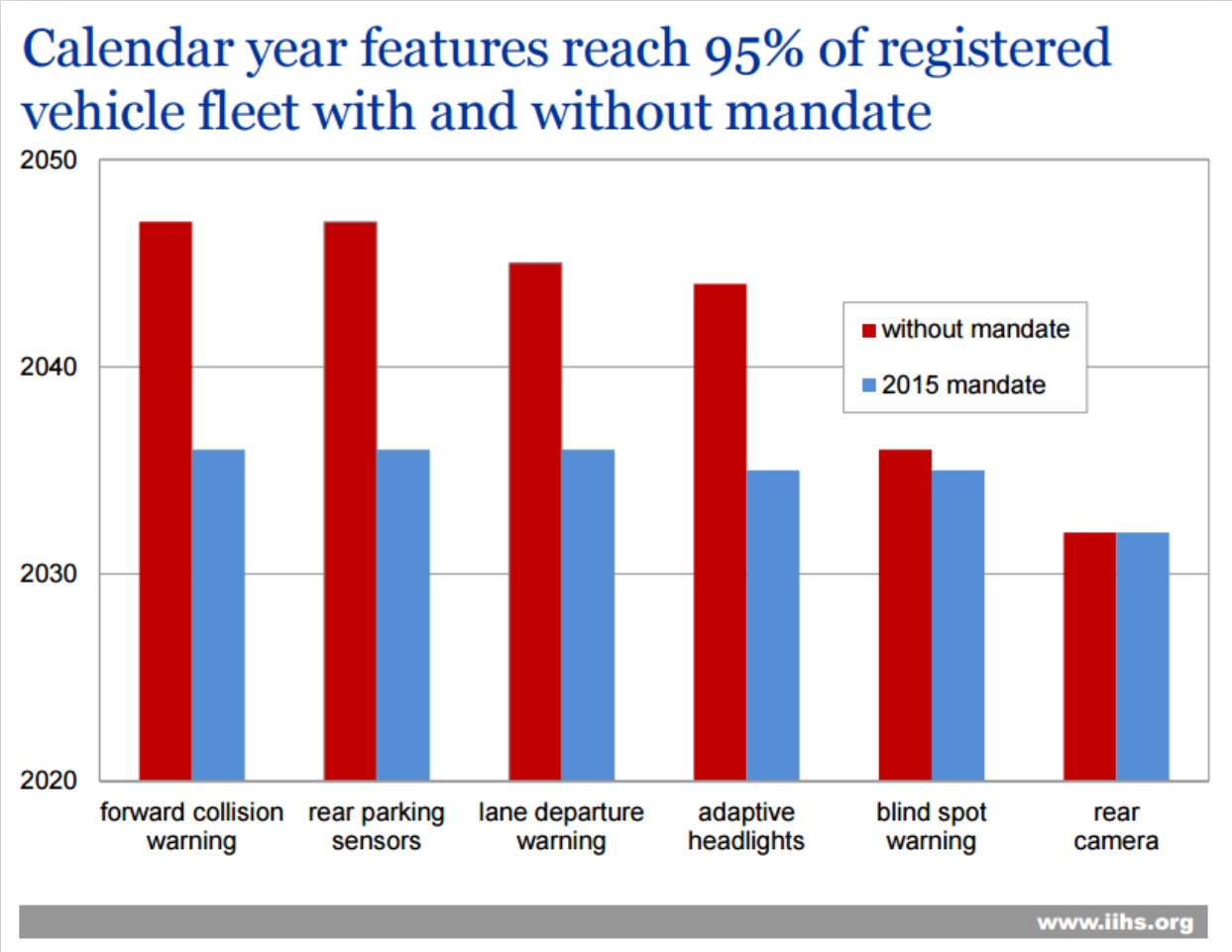
FEB 23 Volvo will run a public test of self-driving cars with 100 real people in 2017

FEB 2 Uber just announced its own self-driving car project

Where are they now?



Penetration of new technology



NHTSA's Vehicle Automation Guidelines

- **Level 0:** No Automation
- **Level 1:** Function-specific Automation
- **Level 2:** Combined Function Automation
- **Level 3:** Limited Self-driving Automation
- **Level 4:** Full Self-Driving Automation

Automated vehicles

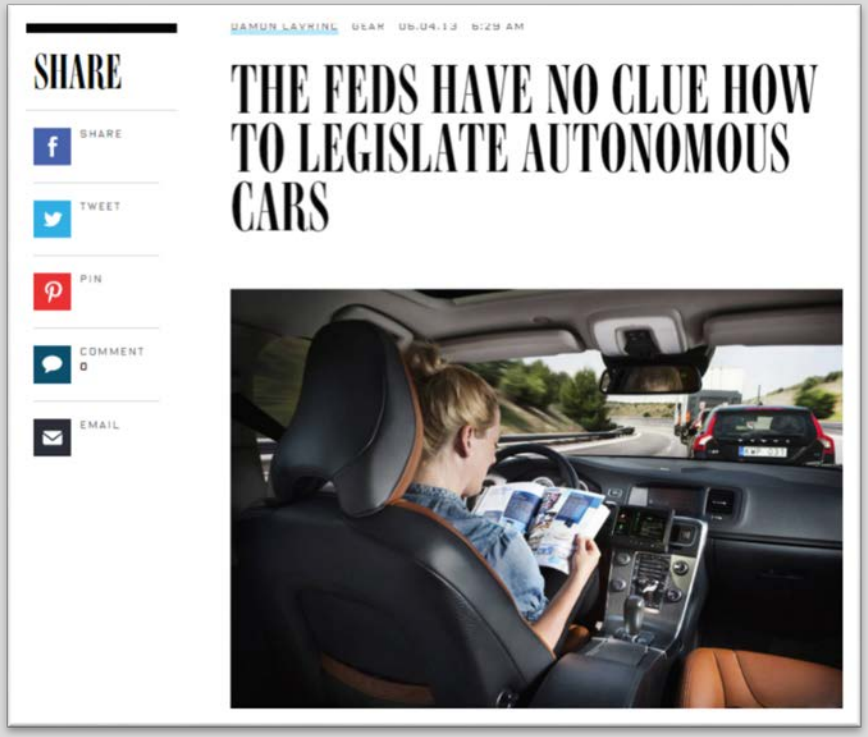
- Vehicle automation may not eliminate the need for drivers but it may change the driver's interaction with the vehicle.
- For example, **commercial air travel**
  - Highly-instrumented, highly-automated
  - Pilots oversee instruments, but **must still remain engaged and in the loop**

Vehicle Auto Manufacturers

- Even with full automation, drivers must still remain in the loop
- If we build cars so that we rarely need to be attentive… Then we will rarely be attentive when we need to be. (Hancock)

Mobility Innovations

- Self-driving vehicles → robotic carriages?



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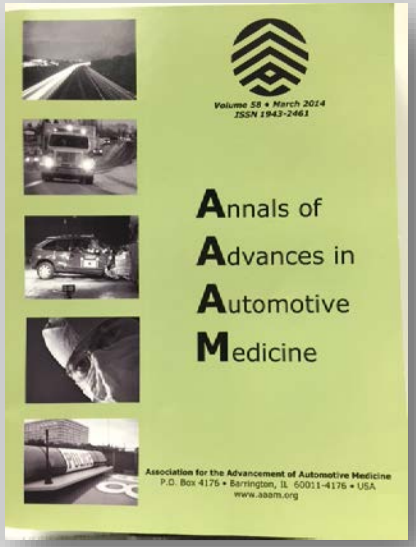
THE FEDS HAVE NO CLUE HOW TO LEGISLATE AUTONOMOUS CARS

Mobility Innovations (continued)

- Uber, Lyft, others
  - Advanced vehicle technology → high-end vehicles
  - Leverages existing road and mobile infrastructure
  - Online, on-demand ordering, and mobile payment services
  - Already very popular in urban environments
- Car- and ride-sharing clubs

State Farm's Role

- Support vehicle safety and repairability research (IIHS / HLDI)
- Advanced vehicle research – U of Michigan's Mobility Transformation Center
- Distracted driving research – AAAM



Some critical research questions

- Handoff?
  - What is "**sufficiently comfortable transition time**"?
- Ethical considerations?
- Liability considerations?

Questions?

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